

Patent  
Attorney Docket No. LYNN/0020

wherein the gas barrier comprises a polymer;

a porous, electrically conducting member in electrical contact with each side of the electrically conducting pathway, the member selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof; and

flowfields formed in the porous, electrically conducting member.

7. (Twice Amended) A bipolar plate for electrochemical cells, comprising:

a porous, electrically conducting sheet selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof; [and]

a gas impermeable material disposed within a minor portion of the sheet to form a gas barrier; and

flowfields formed in the porous, electrically conducting member.

F 34 23. (Twice Amended) The bipolar plate of claim 20 further comprising a polymeric cell frame peripherally enclosing the two porous electrically conducting sheets.

F 35 24. (Twice Amended) The bipolar plate of claim 23 wherein the polymeric cell frame includes channels in fluid communication with the two porous electrically conducting sheets.

Please enter the following new claims:

41 21. A bipolar plate for electrochemical cells, comprising:

a gas barrier having an electrically conducting pathway extending therethrough, wherein the gas barrier comprises a polymer;

two porous, electrically conducting members, in electrical contact with each side of the electrically conducting pathway, the member selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon

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material and combinations thereof; and

a cooling fluid channel within the gas barrier.--

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~~42~~ <sup>separator 41</sup>  
--22. The bipolar plate of claim ~~21~~, wherein the cooling fluid channel is water permeable.--

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~~43~~ <sup>separator 41</sup>  
--23. The bipolar plate of claim ~~21~~, wherein the cooling fluid channel is disposed through or in contact with the gas impermeable material.--

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~~44~~ <sup>separator 41</sup>  
--24. The bipolar plate of claim ~~21~~, wherein the cooling fluid channels comprise a plurality of cooling fluid tubes.--

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--35. A bipolar plate for electrochemical cells, comprising:

a porous, electrically conducting sheet selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof; and

a gas impermeable material disposed within a minor portion of the sheet to form a gas barrier, wherein the gas impermeable material is an epoxy.--

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--36. A bipolar plate for electrochemical cells, comprising:

a porous, electrically conducting sheet selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof;

a gas impermeable material disposed within a minor portion of the sheet to form a gas barrier, wherein the gas impermeable material is disposed within a face of the sheet; and

a second porous, electrically conducting sheet selected from the group consisting of expanded metal mesh, metal foam, conducting polymer foam, porous conductive carbon material and combinations thereof, wherein the second porous sheet is in electrical contact with the face of the porous sheet having the gas barrier.—